STC-GV, STC-GVT Siemens Turbocompressor – Integrally Geared, Vertically split volute casing

A success story since 1948

Since its inception 60 years ago, the STC-GV compressor series has been meeting demands for compression solutions with high efficiencies and pressures up to 200 bar. STC-GV compressors, designed according to customer specifications and in accordance with both API 617 and API 672, guarantee the highest quality and technical standards for a broad range of industrial application.

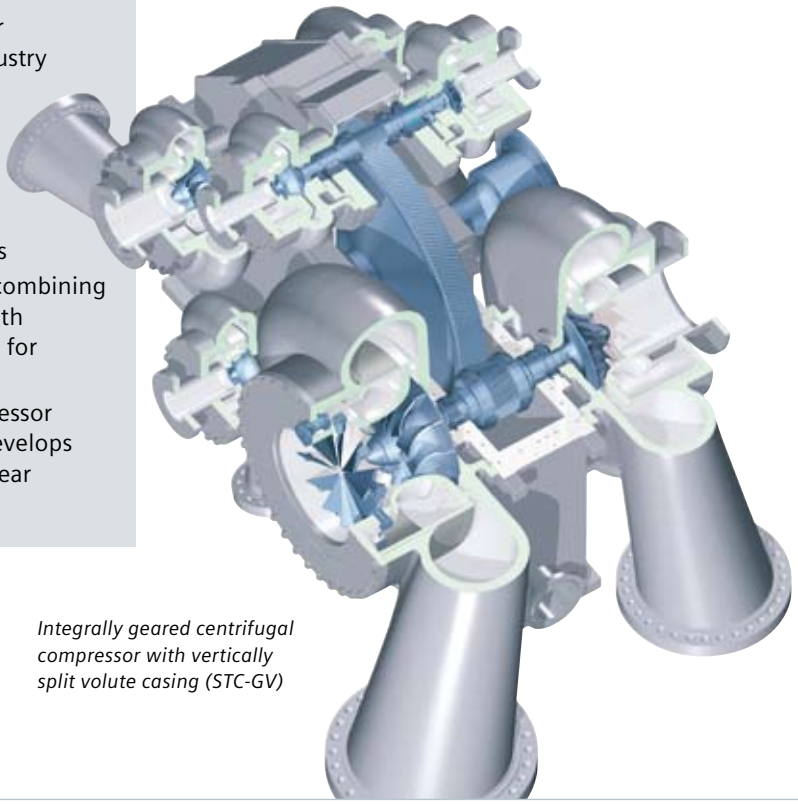
An innovative and compact design allows for an integrated turbine drive within STC-GV, where compressor stages and turbine are mounted on the same gear (STC-GVT).

Fields of application

- Air separation
- Ammonia
- Carbon capture and storage
- Ethylene oxide
- Flare mitigation
- Fuel gas
- Hydrocarbons
- Metallurgy
  - Direct reduction
  - Direct smelting
- Petrochemicals
- Phenol
- Refineries
- Synthetic fibers

Highlights

- The perfect match for all air separation and process industry requirements
- High efficiency and outstanding operating range
- Powerful and robust design, with integrated turbine or expander options
- Flexible design concepts combining custom-tailored design with standardized components for maximum reliability
- Siemens is the only compressor manufacturer who also develops and supplies proprietary gear technology



Integrally geared centrifugal compressor with vertically split volute casing (STC-GV)

Siemens Turbocompressors

Answers for energy.

SIEMENS

Design Concept

Powerful, robust and reliable

The STC-GV integrally geared centrifugal compressors feature a multi-shaft arrangement with different speeds. All shafts are mounted in maintenance-free, oil-lubricated hydrodynamic bearings. With up to eight compressor stages around a central bull gear, the STC-GV compressor series forms a compact unit for the multi-stage compression of a wide range of gases.

Optimized shaft speeds, modern impellers, tailored aerodynamics and mechanics along with optimized auxiliaries guarantee the highest efficiency. Adjustable guide vane units at the first and/or any other compression stage optimize the operating range. External cooler arrangements allow for operation at extreme site conditions.

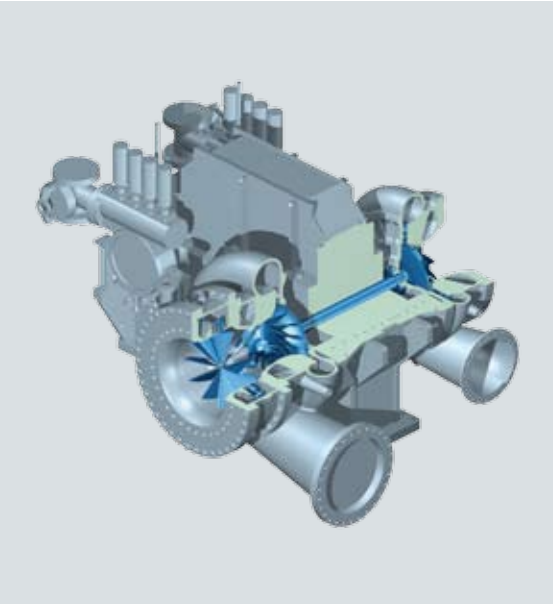
Package and driver options

For most STC-GV compressor sizes, Siemens offers a package design. The package includes the compressor, driver, process gas coolers, lube oil console, process piping and all tubing and wiring. The package design leads to significantly reduced on-site installation time. These compressor types are also suitable for direct turbine-drive or integrated turbine design (STC-GVT).

Driver: depending on process and energy resources: steam turbine, gas turbine or electric motor.

Siemens also offers variants of the STC-GV:

- STC-GV (H): this compressor is designed for high-pressure application with suction pressures higher than 5 bar, especially booster air in air separation.
- STC-GVT: a new and compact design, STC-GV is also available with integrated turbine drive, compressor stages and turbine being mounted on the same gear.
- STC-GT: single- or multi-stage expanders enable power recovery from process gases.
- STC-GVT: with its single or multiple expander stages, STC-GVT is the ideal solution for simultaneous gas compression and expansion of process gas.



Integrally geared turbocompressor with integrated steam turbine (STC-GVT)

STC-GVT on testbed

Main air compressor for a steel plant

Rotor assembly of an integrally geared turbocompressor

Highlights

- Integrally geared, multi-stage design
- Wide operating range and outstanding part-load efficiency at turndown
- Multi-service capability due to finely-graded standard components
- Feeds multiple functions from one casing
- Can be used in toxic, corrosive and hydrocarbon application
- Up to eight stages
- Casing (volutes) fabricated or cast-material: from cast iron to stainless steel
- Axial inlet to each impeller, intercooling between stages
- High-efficiency water separators
- Flexible cooler design
- Design codes for any kind of gas
- Design codes API 617 and API 672

GVT with expansion stage(s)

- Inlet guide vane unit in front of each stage
- Optional interheating between stages

Control systems

Perfect protection and process control via flexible Siemens compressor automation (SCAUT) control systems:

- Anti-surge protection
- Performance controllers acting on mass flow, suction pressure or discharge pressure
- Simultaneous control of sets of variable inlet guide vanes
- Controlled by throttling, bypass operation or inlet whirl variation
- Operation with all available drive systems, i. e. electric motors, steam turbines and gas turbines
- Fully automatic or semi-automatic start-up and shutdown sequences exactly matched to customers' process demands
- Certified safety systems available

Technical data

- Volume flow rates up to 480,000 m^3/h (280,000 cfm)
- Discharge pressure up to 100 bar (1,450 psi) air and other gases
- Discharge pressure up to 200 bar (2,900 psi) CO_2
- Gearbox ratings up to 60,000 kW (80,000 hp)

Air separation

Siemens integrally geared turbocompressors STC-GV are the perfect match for air separation and air compression. In these processes, the integrally geared turbocompressor serves as main or booster air compressor, combined main and booster air compressor and oxygen compressor. While as main air compressor (MAC), discharge pressures between 5 and 30 bar are key, the booster air compressor (BAC) STC-GV (H) realizes up to 100 bar, depending on process specifications.

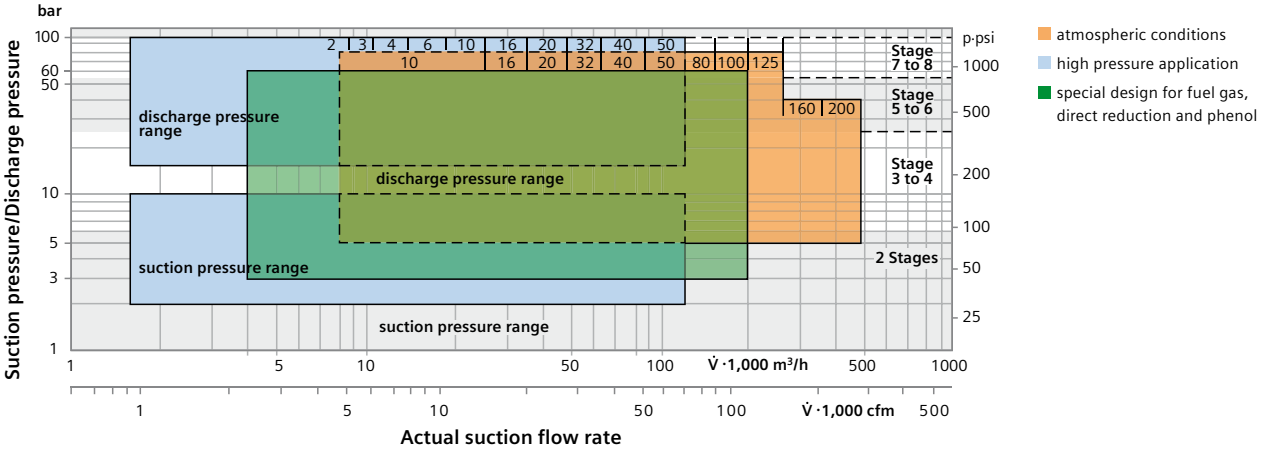
CO_2 compression

The compressors in the STC-GV series are ideal for CO_2 compression where high-pressure capacities of about 200 bar are essential, paired with the highest efficiencies and most reliable technologies. Based on standardized machine concepts, Siemens has developed a tailor-made, optimized solution for carbon capture and storage. The integrally geared compressor series STC-GV covers a suction volume of CO_2 between 25,000 and 250,000 m^3/h. With multistage design and possible intercooling after each stage, the STC-GV realizes up to 200 bar in one machine. Up to eight stages enable four different rotational speeds, leading to optimized aerodynamic efficiencies.

Benefits

- Proven design concept, patented in 1948
- High efficiency and wide operating range
- Multi-service capability and various application options in one casing
- Long life due to process-optimized materials
- Cost-efficient, compact compression solution
- Siemens-owned gear technology
- Flexible cooler design
- High-efficiency water separators

Application range STC-GV for air and other gases



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Oil & Gas Division
Order No. E50001-G420-A114-X-4A00
Printed in Germany
Dispo 34806, c4bs 7489 P WS 06095.

Printed on elementary chlorine-free bleached paper.